

JUL 10 2007

PATENT APPLICATION  
DOCKET NO.: 200315309-1

REMARKS

Claims 1, 4, 8, 16, 19, 20, and 26-35 are presented for examination, of which claims 1 and 16 are in independent form.

By the present Response, base claims 1 and 16 are amended to include the subject matter of dependent claims 2 and 17 respectively and claims 2 and 17 are canceled. No new matter is added thereby.

Favorable reconsideration of the present patent application as currently constituted is respectfully requested.

Regarding the Claim Rejections - 35 U.S.C. §102(b)

Claims 1, 2, 4, 8, 16-20, 26, 28, 31 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,839,188 to Pommer (hereinafter the *Pommer* reference). In connection with these rejections, the Examiner commented as follows with respect to base claims 1 and 16 and with respect to dependent claims 2 and 17, the subject matter of which has been incorporated respectively into base claims 1 and 16:

As to claims 1, 4, 16, 19, 26, 28, 31, 33, Pommer discloses a printed circuit board (PCB) substrate and its method (10) as shown in figures 1-3, comprising:

first and second dielectric materials (dielectric layers 22, 32) associated with first and second current return layers (24, 34);

a signal path layer (26; 36) interposed between said first dielectric material and said second dielectric material; and

an adhesive layer (40) interposed between said first and second dielectric materials, said adhesive layer (40) being substantially coplanar relative to said signal path layer (26; 36), said adhesive layer (40) comprises dielectric material selected from the group consisting of a two-sided adhesive tape, an epoxy adhesive sheet that contains a glass based adhesive (44, column 8, line 11), having a lower loss tangent than said first dielectric material and has a higher glass transition point than said first dielectric material, see column 7, line 57 through column 8, line 54), note: the adhesive containing a glass particles within such that the loss tangent is lower than the resin (dielectric layer).

As to claims 2, 17, Pommer discloses said adhesive layer (40) is comprised of a material operable to substantially reduce attenuation due to an electrical coupling effect between a pair of signal traces (26, 36) disposed in said signal path layer.

Applicant respectfully submits that the foregoing §102(b) rejections have been overcome or otherwise rendered moot by the present Response. As currently defined by base claim 1, an embodiment of the present disclosure is directed to a printed circuit board (PCB) substrate that comprises, *inter alia*, an adhesive layer interposed between a first dielectric material and a second dielectric material, wherein the adhesive layer has a lower loss tangent than at least one of the first and second dielectric materials and wherein the adhesive layer is comprised

PATENT APPLICATION  
DOCKET NO.: 200315309-1

of a material operable to substantially reduce attenuation due to an electrical flux coupling effect between a pair of signal traces disposed in the signal path layer.

Similarly, as currently defined by base claim 16, an embodiment of the present disclosure is directed to a method for constructing a printed circuit board substrate that involves, *inter alia*, selecting an adhesive layer that has a lower loss tangent than a first and second dielectric materials used in the PCB, providing the adhesive layer interposed between the first dielectric material and the second dielectric material, wherein the adhesive layer operates to substantially reduce attenuation due to an electrical coupling effect between a pair of signal traces disposed in the signal path layer.

As noted in Applicant's prior Response of February 7, 2007, the *Pommer* reference is directed to an adhesive layer for a PCB, the adhesive layer containing gauge particles interspersed within a non-conductive thermosetting adhesive material to provide mechanical separation between two dielectric substrates. *Pommer* notes that the non-conductive thermosetting adhesive can include polyimide, epoxy, butyrl phenolic, etc. See column 7, line 57 through column 8, line 8. The dielectric materials disclosed in *Pommer* include polyimide, polyester, PEN, polyetherimide, epoxy,

ceramic, impregnated woven or non-woven glass. See column 7, lines 8-14. However, neither the cited excerpts nor other parts of *Pommer* appear to disclose that the adhesive embodiments have a lower loss tangent than the dielectric material used in the PCB substrate as currently claimed.

In reply to Applicant's prior Response, The Examiner has remarked in the pending Office Action that the adhesive of *Pommer* contains glass particles thereby lowering the loss tangent.

Applicant notes that the adhesive material of *Pommer* is composed of two distinct components (i.e., adhesive component 42 and gauge particles 44) that do not mix with each other. After the

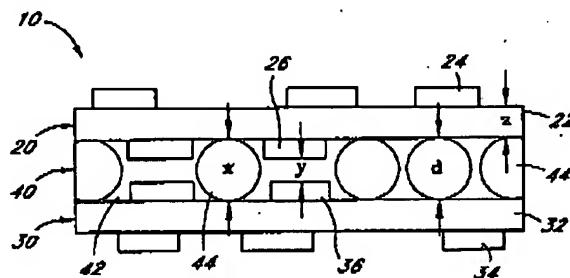


FIG. 3

adhesive is in place in PCB 10, these components are not evenly dispersed within the adhesive layer. See FIG. 3 reproduced herein. It is therefore improper to attribute a property such as loss tangent to such a material as a whole when the effect of the gauge particles is very localized and the placement of the gauge particles in the finished product is not directly controllable. While the gauge particles 44 of *Pommer* may affect the dielectric

PATENT APPLICATION  
DOCKET NO.: 200315309-1

constant and the loss tangent of the adhesive as a whole, the gauge particles shown in *Pommer* are not present between signal traces 26, 36 disposed in the signal path layer and cannot provide reduction of attenuation due to an electrical flux coupling effect between these signal traces. Accordingly, Applicant maintains that *Pommer* does not disclose an adhesive layer that has a lower loss tangent than at least one of the dielectric materials used and that is operable to substantially reduce attenuation due to electrical flux coupling effects between signal traces, as currently claimed.

For at least the reasons discussed above, Applicant respectfully submits that the applied art of record neither anticipates nor suggests the features of base claim 1 and that claim 1 is therefore in condition for allowance. Base claim 16 is also distinguishable over the cited reference for the same reasons. Further, claims 4, 8, 31 and 33 are dependent from base claim 1 and claims 19, 20, 26 and 28 are dependent from base claim 16 and each of these dependent claims introduces additional features therein. Accordingly, these dependent claims are believed to be in condition for allowance over the art of record.

Regarding the Claim Rejections - 35 U.S.C. §103(a)

Claims 29-30 and 34-35 are rejected under 35 U.S.C. 103(a) as being anticipated by *Pommer* in view of U.S. Patent 6,344,371 to *Fischer et al.*, hereinafter the *Fischer* reference. In connection with these rejections, the Examiner commented as follows with respect to claims 29-30 and 34-35:

Regarding claims 29-30, and 34-35, *Pommer* discloses all of the limitations of the claimed invention, except for the adhesive layer made by ePTPE [sic] having loss tangent of about 0.0036. *Fischer et al.* teaches a multilayer as shown in figures 1-10 comprising an adhesive filler made by ePTPE [sic] and having a loss tangent about 0.0036.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a teaching of *Fischer* applied in the PCB of *Pommer* in order to provide a high density package.

Claims 29-30 are dependent from base claim 1 and claims 34-35 are dependent from base claim 16 and each contain all of the features of their respective base claims. As discussed above, the *Pommer* reference does not teach or suggest an adhesive layer that has a lower loss tangent than at least one of the dielectric materials used and that is operable to substantially reduce attenuation due to electrical flux coupling effects between signal traces disposed in the adhesive layer.

PATENT APPLICATION  
DOCKET NO.: 200315309-1

Reliance on the *Fischer* reference as a secondary reference for purposes of obviousness is of no avail, however. *Fischer* is directed to a dimensionally stable core for high density chip packages. The core reduces material movement of the substrate and achieves uniform shrinkage from substrate to substrate during lamination processing of the chip

packages. See Abstract. *Fischer* describes a number of embodiments, such as the embodiment of Figure 5, shown here.

This embodiment has laminated dielectric layers 30 and 32, metal cap layers 40 and

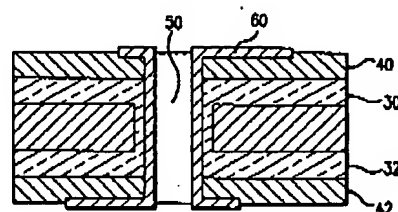


FIG.5

42, via 50 and metal layer 60, all built around a central core (unmarked in this figure). *Fischer* discloses several embodiments of dielectric layers 30 and 32 having a dielectric layer formed of a composite of adhesive, filler, and ePTFE. *Fischer* does not appear to disclose a PCB having a separate adhesive layer interposed between first and second dielectric layers, let alone an adhesive layer that has a lower loss tangent than at least one of the dielectric materials used and that is operable to substantially reduce attenuation due to electrical coupling effects between signal traces. At best, the adhesives mentioned in this reference are present as part of the dielectric layer,

JUL 10 2007

PATENT APPLICATION  
DOCKET NO.: 200315309-1

binding the components of that layer together. Thus, the combination of *Pommer* and *Fischer* references does not teach or suggest all the limitations of the claims as currently constituted.

For at least the reasons discussed above, Applicant respectfully submits that claims 29-30 and 34-35 are in condition for allowance over the applied art of record.

Regarding the Allowable Claims

The Examiner indicated that claims 27 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The Examiner is thanked for the indication of allowable subject matter. Applicant has shown that the rejection of base claims 1 and 16 has been overcome and that these claims are in condition for allowance. Accordingly, claims 27 and 32, which are dependent from 1 and 16 respectively, are also in condition for allowance in their current form.



JUL 10 2007

PATENT APPLICATION  
DOCKET NO.: 200315309-1

SUMMARY AND CONCLUSION

In view of the fact that none of the art of the record, whether considered alone or in combination discloses, anticipates or suggests the pending claims, and in further view of the above remarks and/or amendments, reconsideration of the Action and allowance of the present patent application are respectfully requested and are believed to be appropriate.

Dated: 7/10/2007

Respectfully submitted,



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